

Trend Study 11B-5-00

Study site name: B Canyon .

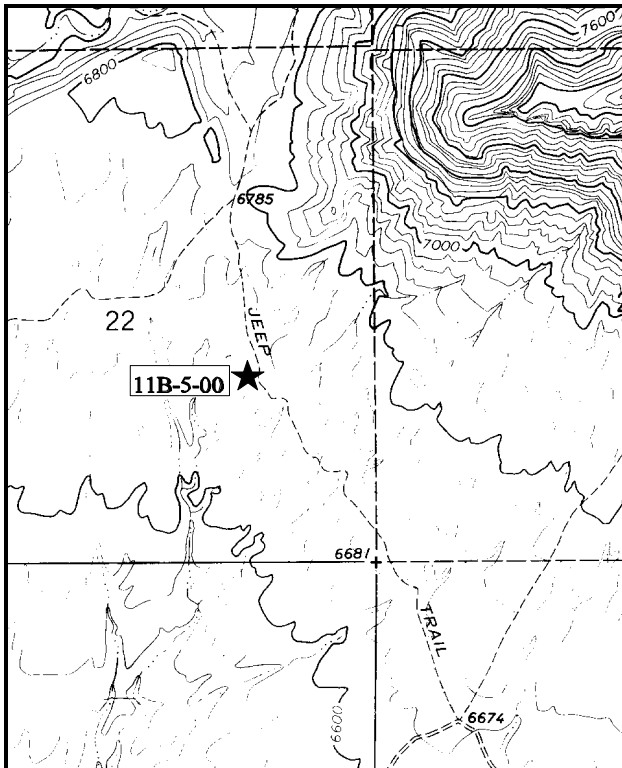
Range type: Chained, Seeded P-J Burn

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

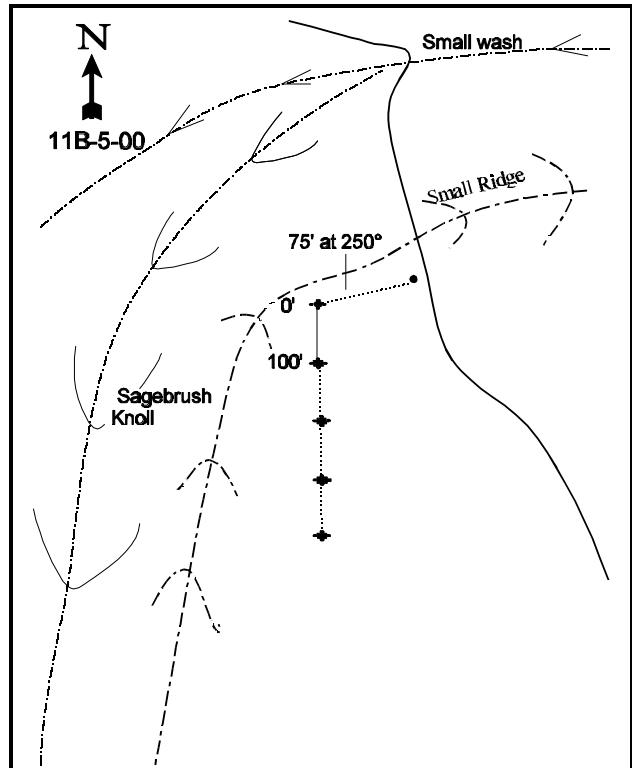
LOCATION DESCRIPTION

From the Sunnyside City limit sign on Highway 123 at the west end of town, turn north and go 0.2 miles, passing the East Carbon High School football field. Turn right and go 0.95 miles. Turn right and pass through a yellow metal gate, continuing 0.3 miles to a cattle guard. Stay on the main road and go north 2.05 miles to an intersection. Keep left at the intersection (right turn goes to A Canyon transect) and go 0.75 miles more to just beyond the crest of a small hill. On the left side of the road you should find a large white rock. The transect, marked by a red painted rebar (tag #7894), starts 75 feet away at a bearing of 235°M.



Map Name: Sunnyside 7.5'

Township 14S , Range 13E , Section 22



Diagrammatic Sketch

UTM. 4382172.724 N, 547990.634 E

DISCUSSION

Trend Study No. 11B-5 (32-6)

The 'B' Canyon study site is located near the mouth of 'B' Canyon on the gentle west-facing slope at the base of the Book Cliffs. Elevation at the site is 6,700 feet. The site is about 4 miles northwest of Sunnyside. Plans have been proposed to mine 15 million tons of coal from the 'B' Canyon mining project. Surface facilities, in addition to improved roads, would be located on public lands within the deer winter range. In 1966, the area was two-way chained and seeded to crested wheatgrass, fourwing saltbush, and nomad alfalfa. After 20 years, the site was again being dominated by the release of the young trees left after the original chaining. Pinyon and juniper density was estimated at 250 plants/acre (pinyon at 106 trees/acre and juniper at 149) in 1994, most were young trees. In 1996, the area was burned by a wildfire, and afterward, chained and apparently seeded with a dribbler. The wildfire eliminated all of the trees and nearly all of the shrubs. The only shrubs left are a few surviving mountain mahogany, bitterbrush, and resprouting green ephedra.

The site is on the Mud Springs grazing allotment, which is permitted for 338 cattle from mid-October to mid-June. The four pastures are rotated on the basis of forage condition and water availability as determined by the permittee. Cattle use on the site appears to be light to moderate. Judging from pellet groups, deer use is light, elk use is negligible, with rabbit use being somewhat heavier. Pellet group data from the 2000 reading estimate 9 deer and 4 cow days use/acre (22 ddu/ha, 10 cdu/ha). Rabbit pellets were frequently encountered.

The soil is moderately deep, but fairly rocky and variable as demonstrated by the presence of both black sagebrush and mountain big sagebrush prior to the fire. Effective soil depth is estimated at 13.7 inches. It has a sandy clay loam texture with a soil reaction that is neutral (7.3 pH). Phosphorus is limited at just 5.2 ppm, where values less than 10 ppm may limit normal plant growth and development. There are patches of exposed soil, but overall ground cover is good and erosion minimal. Rocks and pavement are found in the bare areas and large rocks and boulders are common within the soil profile and exposed on the surface. Many rocks in the soil profile contain a calcium carbonate crust.

The most numerous shrub prior to the 1996 fire was black sagebrush. It made up 56% of the browse cover in 1994 with a population of 6,080 plants/acre. The majority of these plants were mature and vigorous although rather heavily browsed in 1986. There was also some scattered mountain big sagebrush plants (180 plants/acre). Less numerous shrubs in the area included green ephedra (40 plants/acre) and true mountain mahogany (60 plants/acre). After the wildfire of 1996, there remained only a few surviving or resprouting fourwing saltbush (40 plants/acre), mountain mahogany (20 plants/acre), green ephedra (200 plants/acre), and bitterbrush (20 plants/acre). All of the fourwing and mountain mahogany and nearly all (90%) of the green ephedra were heavily hedged.

Before and after the fire, crested wheatgrass is the dominate herbaceous plant. They are tall, vigorous and appear to be lightly grazed. A few other valuable species, including Indian ricegrass, smooth brome, bluebunch wheatgrass, and mutton bluegrass are present, but provide only limited forage. Abundance of forbs is low as illustrated by no more than 1% cover for all forbs combined in 1994 and 2000.

1986 APPARENT TREND ASSESSMENT

The range appears to be in good condition. The key species, black sagebrush, is vigorous and productive. Although there is a fairly high percentage of decadent plants, there is a healthy number of young plants and the population appears stable. The one downward parameter is the increasing cover of the released pinyon and juniper, which in time could restrict growth and reproduction of more desirable browse species. Except for scattered bare patches, ground cover is excellent with little erosion. Therefore, the current soil trend appears to be stable also.

1994 TREND ASSESSMENT

The trend for soil is stable with percent bare ground decreasing slightly and a good cover value for grasses. The trend for browse is slightly up for the key browse species, black sagebrush. Percent decadency has declined (27% to 14%) and the percentage of plants that were moderate to heavily hedged has also gone down (67% to 1%). Trend for the herbaceous understory species is stable with nested frequency values that are almost unchanged from 1986. There was a slight decrease for the forbs, but altogether they provide less than 1% of the vegetative cover.

TREND ASSESSMENT

soil - stable (3)

browse - slightly up (4)

herbaceous understory - stable (3)

2000 TREND ASSESSMENT

Trend for soil is slightly down with percent bare ground increasing and litter cover and vegetative cover declining. Since the fire, vegetation cover has changed from mainly shrub and tree cover to mostly herbaceous cover. Grass cover has doubled with sum of nested frequency increasing. Even with this change in composition, the ratio of bare soil to protective cover has decreased significantly. Erosion is not a noticeable problem on the site due to the abundant herbaceous cover combined with the gentle slope. Trend for browse is down due to a loss of most shrubs to fire. The few surviving preferred browse species are being heavily used but should increase through time. Trend for the herbaceous understory is up with an increase in the sum of nested frequency for perennial grasses and forbs. Nested frequency of the dominant grass, crested wheatgrass, remained stable but several other species increased.

TREND ASSESSMENT

soil - down slightly due to fire (2)

browse - down, most browse eliminated due to the fire (1)

herbaceous understory - up (5)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 5

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	Agropyron cristatum	269	263	274	94	87	95	9.44	17.78
G	Agropyron intermedium	a-	a-	b ⁴³	-	-	19	-	1.74
G	Agropyron smithii	4	-	-	2	-	-	-	-
G	Agropyron spicatum	a-	b ⁶	a-	-	3	-	.33	-
G	Bouteloua gracilis	-	-	3	-	-	1	-	.03
G	Bromus inermis	12	6	4	5	4	1	.21	.38
G	Dactylis glomerata	a-	a-	b ⁹	-	-	3	-	.04
G	Festuca ovina	a-	a-	b ¹⁵	-	-	9	-	.09
G	Hilaria jamesii	a-	b ¹²	a-	-	6	-	.10	-
G	Oryzopsis hymenoides	10	4	8	8	2	3	.06	.99
G	Poa fendleriana	a-	b ⁷	a-	-	3	-	.21	-
G	Sitanion hystrix	1	-	-	1	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		296	298	356	110	105	131	10.36	21.06
Total for Grasses		296	298	356	110	105	131	10.36	21.06
F	Arabis selbyi	ab ²	b ¹¹	a-	2	5	-	.02	-
F	Astragalus convallarius	ab ¹³	a ⁹	b ²¹	5	3	12	.20	.55
F	Astragalus wingatanus	b ²¹	ab ¹⁵	a-	14	7	-	.46	.06
F	Chenopodium fremontii (a)	-	-	6	-	-	2	-	.01
F	Hedysarum boreale	2	-	3	2	-	1	-	.15
F	Lesquerella ludoviciana	3	7	5	1	3	3	.01	.01
F	Linum lewisii	-	-	8	-	-	3	-	.02
F	Machaeranthera grindelioides	3	1	-	1	1	-	.03	-
F	Medicago sativa	5	-	5	2	-	2	-	.01
F	Penstemon cyanocaulis	b ¹⁷	a ⁵	a ⁴	11	2	2	.01	.03
F	Salsola iberica (a)	-	-	12	-	-	4	-	.04
F	Sanguisorba minor	-	-	1	-	-	1	-	.03
F	Schoenocrambe linifolia	a-	a ³	b ¹⁶	-	2	8	.01	.06
F	Sphaeralcea coccinea	3	-	6	1	-	2	-	.01
Total for Annual Forbs		0	0	18	0	0	6	0	0.05
Total for Perennial Forbs		69	51	69	39	23	34	0.76	0.94
Total for Forbs		69	51	87	39	23	40	0.76	1.00

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 11B, Study no: 5

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Artemisia nova	78	0	8.85	-
B	Artemisia tridentata vaseyana	3	0	.81	-
B	Atriplex canescens	0	2	-	-
B	Cercocarpus montanus	3	1	1.00	.03
B	Ephedra viridis	2	2	.41	.15
B	Gutierrezia sarothrae	8	1	.21	-
B	Juniperus osteosperma	0	0	3.00	-
B	Opuntia spp	1	0	-	-
B	Pinus edulis	0	0	1.63	-
B	Purshia tridentata	0	1	-	.15
Total for Browse		95	7	15.93	0.33

BASIC COVER --

Herd unit 11B, Study no: 5

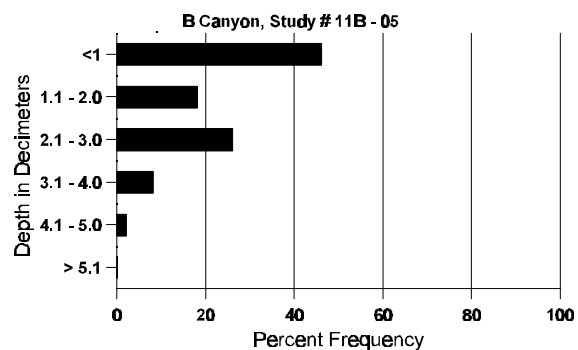
Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	292	303	11.50	28.43	24.17
Rock	235	233	7.00	10.55	13.60
Pavement	195	323	3.75	1.52	6.80
Litter	386	359	60.50	45.45	30.78
Cryptogams	77	3	.75	2.80	.63
Bare Ground	244	350	16.50	15.73	38.27

SOIL ANALYSIS DATA --

Herd Unit 11B, Study # 5, Study Name: B Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	PPM P	PPM K	dS/m
13.72	51.4 (13.78)	7.3	51.0	26.4	22.6	2.2	5.2	124.8	0.7

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 11B, Study no: 5

Type	Quadrat Frequency		Pellet Transect	
	'94	'00	Pellet Groups per Acre 00	Days Use per Acre (ha) 00
Rabbit	20	66	209	N/A
Elk	1	-	-	-
Deer	35	20	113	9 (22)
Cattle	-	1	52	5 (11)

BROWSE CHARACTERISTICS --

Herd unit 11B, Study no: 5

A Y G R E		Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia nova																		
S	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400			6
	94	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	6	1	2	-	-	-	-	-	-	9	-	-	-	600			9
	94	25	1	-	-	-	-	-	-	-	26	-	-	-	520			26
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	12	7	39	-	-	-	-	-	-	56	1	1	-	3866	9	16	58
	94	159	42	-	-	34	-	-	-	-	235	-	-	-	4700	15	21	235
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	86	3	1	21	-	-	-	-	-	-	23	-	2	-	1666			25
	94	24	11	2	1	5	-	-	-	-	33	-	-	10	860			43
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	220			11
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		10%			67%			03%			- 1%							
'94		31%			.65%			03%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	6132	Dec:	27%			
												'94	6080		14%			
												'00	0		0%			

A Y G R E	Form Class (No. of Plants)	Vigor Class									Plants Per Acre	Average (inches)		Total			
		1	2	3	4	5	6	7	8	9		1	2		3	4	Ht.
Artemisia tridentata vaseyana																	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	1	-	-	-	-	-	-	-	-	-	1	-	-	20		1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
M	86	-	3	-	-	-	-	-	-	-	3	-	-	-	200	20	20
	94	3	4	-	-	-	-	-	-	-	7	-	-	-	140	16	28
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'86		100%			00%			00%			-10%						
'94		44%			00%			00%									
'00		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'86	200	Dec:	0%		
												'94	180		11%		
												'00	0		0%		
Atriplex canescens																	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	1	-	-	1	2	-	-	-	40		2
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
D	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'86		00%			00%			00%									
'94		00%			00%			00%									
'00		00%			100%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	100%		
												'94	0		0%		
												'00	40		0%		
Cercocarpus montanus																	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
	94	1	-	-	1	1	-	-	-	-	3	-	-	-	60	38	42
	00	-	-	-	-	-	1	-	-	-	1	-	-	-	20	9	8
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'86		00%			00%			00%									
'94		33%			00%			00%			-67%						
'00		00%			100%			00%									
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-		
												'94	60		-		
												'00	20		-		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Ephedra viridis																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	1	-	-	-	-	-	-	-	-	1	-	-	20		1	
M	86	-	1	-	-	-	-	-	-	-	-	-	1	-	66	36	25	
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	26	24	
	00	-	-	9	-	-	-	-	-	-	9	-	-	-	180	11	12	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		100%			00%			100%			-39%							
'94		00%			00%			00%			+80%							
'00		10%			90%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'94	40		-			
												'00	200		-			
Gutierrezia sarothrae																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	94	12	-	-	-	-	-	-	-	-	12	-	-	-	240	8	7	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%			-93%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	300		-			
												'00	20		-			
Juniperus osteosperma																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	1	-	1	-	1	-	-	-	-	3	-	-	-	200	72	35	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		25%			25%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	266	Dec:	-			
												'94	0		-			
												'00	0		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	-	1	-	-	20	5	13	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	16	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	20		-			
												'00	0		-			
Pinus edulis																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	108	71	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	132	Dec:	-			
												'94	0		-			
												'00	0		-			
Purshia tridentata																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13	24	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'94	0		-			
												'00	20		-			